Finding of No Significant Impact
for the
Closure of the High-Level Waste
Tanks in F- and H-Areas
at the Savannah River Site

Agency: U.S. Department of Energy

Action: Finding of No Significant Impact

Summary: The Department of Energy (DOE) has prepared an environmental assessment (EA) (DOE/EA-1164) for the proposed closure of the high-level waste tanks in F- and H-Areas on the Savannah River Site (SRS), near Aiken, South Carolina. Based on the analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required, and DOE is issuing this Finding of No Significant Impact (FONSI).

Public Availability:

Copies of the EA and FONSI or further information on the DOE NEPA process are available from:

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Background: When established in the early 1950s, SRS's primary mission was to produce special nuclear materials to support the defense, research, and medical programs of the United States. SRS's present mission emphasizes waste management, environmental restoration, and decontamination and decommissioning of facilities that are no longer needed for SRS's traditional defense mission. Chemical separation of irradiated fuel and targets at SRS resulted in product streams and acidic liquid streams that contained almost all of the fission products and small amounts of transuranics. This waste was chemically converted to an alkaline solution and stored in large underground tanks at the SRS F- and H-Area Tank Farms as insoluble sludges, precipitated salts, and supernate (liquid) .

At the present time the approximately 129 million liters (34 million gallons) of high-level waste are being treated to separate the high-activity fraction from the low-activity

fraction. The high-activity fraction is transferred to the Defense Waste Processing Facility for vitrification in borosilicate glass to immobilize the radioactive constituents for long term storage. The low-activity fraction is transferred to Z-Area and mixed with grout to make saltstone, a concrete-like material disposed of in the Saltstone Landfill Area.

After the bulk waste has been removed from the tanks for treatment and disposal, the tank systems would become part of the tank systems closure program. The primary concerns are how to manage the small residual waste remaining in the tank in a manner protective of human health and the environment. DOE intends to close the tank systems to protect human health and the environment, and promote safety in and around these tank systems in accordance with South Carolina Regulation R.61-82, "Proper Closeout of Wastewater Treatment Facilities."

Proposed Action: The proposed action is to implement the Industrial Wastewater Closure Plan for F- and H-Area High Level Waste Tank Systems approved by South Carolina Department of Health and Environmental Control (SCDHEC) to remove the contaminants from the tank systems and to fill them with a structural material to prevent future collapse and mitigate potential releases. While the major focus of the closure activities is the high-level waste tanks, the tank farms include other equipment for processing the waste; for example, evaporators, diversion boxes, pumps, and inter-area transfer lines which would be closed in a similar manner. The proposed action begins when bulk waste removal has been completed and the tank system is turned over to the tank closure program. The major steps in tank closure as outlined in the Industrial Wastewater Closure Plan for F- and H-Area High Level Waste Tank Systems are:

Evaluation and Cleaning Phase:

- Determination of Performance Objectives - Environmental regulatory requirements and guidance would be used to develop closure standards that would be protective of human health and the environment. These would provide the regulatory basis for tank closure method.

- Cleanup and Stabilization Selection - After waste removal, an evaluation would be conducted against the closure standards to determine the necessary closure methods to be employed in order to meet performance objectives. High-level waste generated by cleaning would be recycled through the high-level waste processing system.

The residual waste in each tank or group of tanks, as appropriate, would be evaluated to determine the inventory of radiological and nonradiological materials present after bulk waste removal which includes spray washing. This information would be used to conduct a performance evaluation. This evaluation would take into account differences in the types of contamination and equipment configurations, and the hydrogeologic configuration of the tanks, or group of tanks, such as distance from the water table, and distance to nearby streams. The performance evaluation includes modeling the projected

contamination pathways for selected closure configurations and comparing the modeling results to the performance objectives developed in the Industrial Wastewater Closure Plan for F- and H-Area High Level Waste Tank Systems. The performance evaluation will demonstrate compliance with performance objectives agreed to by SCDHEC and Environmental Protection Agency (EPA)

Approval Phase:

- Closure Module Preparation and Approval - A tank system specific Closure Module would be developed that describes the end state of the tank, the performance modeling results, and closure details. The module would be submitted to SCDHEC.

Stabilization Phase:

- Tank Stabilization - The details presented in the approved tank-specific Closure Module will be executed.

After waste removal, each tank, ancillary equipment, tank annulus (if applicable), etc., would be filled with a pumpable, self-leveling backfill material. The fill material would be trucked to an area near the tank farm and pumped to the tank to be closed. The fill material would be formulated with chemical properties that would retard the movement of radionuclides from the closed tank. Thus, the closure configuration for each tank, or group of tanks, would be determined case by case. Although the details of each individual closure would vary, any tank system closure under this alternative would have the following characteristics:

- The fill material is pumpable, self-leveling, designed to prevent future subsidence of the tank, and would fill voids to the extent practical, including equipment and secondary containment.
- The fill material would be formulated to reduce the migration of radionuclides.
- The fill configuration discourages inadvertent intrusion should institutional control be lost.
- The final closure configuration would meet performance objectives approved by SCDHEC and EPA.

The closed tank system will then be turned over to the SRS Environmental Restoration Program.

Alternatives: In addition to the proposed action, DOE considered the following alternatives: (1) No Action (i.e., perform bulk waste removal, add no fill material, and abandon the tanks in place); (2) Bulk waste removal, clean, and fill tanks with sand; (3) bulk waste removal, clean, fill tanks with saltstone; and (4) clean tanks to the extent allowing removal of tanks.

The no-action alternative would only remove the waste. The tank would contain a residual waste and ballast water (as required) and not be filled with a backfill material. The tank would eventually deteriorate, allowing rainwater to pour readily in the exposed hole flushing contaminants from the residual waste in the tank and carrying these contaminants into the groundwater. Since there is no binding material to retard the discharge of the contaminants, the no-action alternative is not a reasonable alternative but was analyzed for baseline purposes.

Although the other alternatives prevent future tank collapse, they were not selected for the following reasons. Sand would leave voids in the tank and equipment, would not bind with any residual waste, and would not retard migration of the contaminants. Saltstone solidifies quickly which is not desirable for this application, would not be practical to ship by truck from the existing facility, would increase worker exposure because it contains radioactive constituents, and would require regulatory permits. New facilities would have to be constructed in F-and H-Areas, while still maintaining all the Z-Area facilities.

Removal of the tanks would be cost prohibitive, cause large radiation exposures to workers, would require construction of additional burial facilities, and for these reasons was not considered a reasonable alternative.

Environmental Impacts: The potential consequences of the proposed closure of the high-level waste tanks in F- and H-Areas at SRS were assessed to determine whether there will be significant impact to the following: water, air, and land resources; floodplains and wetlands; ecological and cultural resources; health and safety; socioeconomic conditions; and transportation. The proposed action would not result in the loss of any lands on SRS. There are no impacts expected to occur to wetlands or sensitive ecological habitats, threatened or endangered species, or cultural resources. Aside from the existing impacts associated with ongoing operations at the tank farms, no additional impacts are projected for surface water or air resources. However, the near surface groundwater (measured at 1-meter and 100 meters down gradient from the tank farms) is expected to become contaminated such that it will not meet SCDHEC standards. This is not expected to occur until several hundred years after tank closure when the tank, grout, and basemat are anticipated to fail due to deterioration. The proposed action, by removing as much of the high-level waste as possible and stabilizing the tank systems and residual waste, will reduce the potential for near-surface groundwater contamination relative to what might be expected in the absence of a closure process.

The mobile contaminants in the tanks will gradually migrate downward through the soil to the groundwater aquifer. The contaminants will be transported by the groundwater to the seepline and subsequently to either Fourmile Branch or Upper Three Runs. The contaminants in the groundwater are expected to be reduced through radioactive decay, such that, by the time they reach the seepline of the creeks they would be within the acceptable limits. Short lived radionuclides, e.g. cesium, would decay prior to migration to the seepline. Upon reaching the surface water, some contaminants, however, will

possibly contaminate the seepline, sediments at the bottom of Fourmile Branch and Upper Three Runs, and the shoreline, but would be at levels below regulatory concerns.

No direct environmental impacts are expected to occur from the transportation of the fill material since the increase in transport vehicles per day is minimal. Both incident free and accident radiological impacts for the closure of the tanks were analyzed. No latent fatal cancers would be expected to result from the implementation of the proposed action.

Determination: Based on the information and analyses in the attached EA, DOE has determined that the proposed closure of the high-level waste tanks in F- and H-Areas at SRS does not constitute a major Federal action significantly affecting the quality of the human environment with the meaning of NEPA. Therefore, an environmental impact statement is not required and DOE is issuing this FONSI.

Signed in Aiken, South Carolina, this 31st day of July, 1996.

for Mario P. Fiori
Manager
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